PART 3. ALTERNATIVES FORMULATION

OVERVIEW

A one-day Alternatives Formulation Workshop was held on February 1, 2001, in order to explore options for providing multiple purpose stormwater management facilities in the Laveen area. The workshop was a professionally facilitated meeting and included nearly 40 invited participants with knowledge of the Laveen area. Participants had expertise in the fields of engineering, hydraulics, hydrology, environmental, open space and land use planning or landscape architecture or represented the interests of public entities (such as the City of Phoenix, Maricopa County, Gila River Indian Community, ADOT), a service provider or a Laveen resident.

To help assure that a wide range of multiple purpose opportunities were included in the planning of the stormwater management system, four functional groups were established to consider and address specific conditions. Ideas and opportunities within each of these functional areas were developed in pre-meetings, prior to the workshop, and presented as "seed ideas" at the workshop to the entire group. The four functional areas were defined as Engineering, Multiple-Use, Landscaping and Environmental. The seed ideas that were developed as a result of the pre-meetings are described in sections below.

Figure 3-1: Goal building session at Alternative Formulation Meeting

FUNCTIONAL AREAS

The stakeholders assembled for the Alternatives Formulation Meeting represented a wide variety of disciplines. In order to ensure attendance of the proper stakeholders, it was decided to limit the meeting to a one, eight-hour day session. Several days prior to the Alternatives Formulation Meeting, the stakeholders assembled in smaller groups, sorted by discipline or interest, to establish the "seed" ideas for those with common interests and goals. This would start off the meeting with determined goals for each area.

The disciplines represented were:

Engineering – Hydrology, hydraulics, civil, geotechnical, agricultural irrigation, utilities, right-of-way
Multi-Use – Recreation planning, land use planning, equestrian
Landscape – Landscape architecture, visual analysis
Environmental – Biology, archeological, hazardous materials, permitting.

Engineering Seed Idea Pre-Meeting Summary

Team members involved in the engineering functional area for the Laveen ADMP met and discussed the information discovered during the existing conditions analysis. Elements of existing conditions within the engineering sphere included:

- The flood control district hydrologic model results,
- The data collected regarding land use and land forms,
- Information obtained through contact with local residents,
- Comments recorded at public meetings and via phone calls,
- And, data from agencies that manage the area.

A map based on the information developed from the existing conditions analysis helped to focus the group on the problem areas. The different flooding areas were analyzed based on the various hydrologic models. These models included the South West South Mountain (SWSM), the Hidden Valley (HV) and the Maricopa Drain (MD) watersheds. The flooding problems were identified within each watershed and several options for minimizing flooding and providing flood protection were discussed.

Very few flooding issues were identified in the SWSM watershed. The largest flooding concern is the likely residential development on an alluvial fan in one of the southernmost sub-areas. Most of this sub-area is within the South Mountain Park boundary. Solutions discussed to resolve this situation included building a large detention basin to limit flows reaching private lands. The next concept was to expand the alluvial fan channel to include a channel along the reservation boundary to collect all of the flows produced by the SWSM watershed and convey them out of the area. The conceptual outfalls for this channel included either continuing the channel westerly through the reservation, or possibly incorporating a pump station to lift the flows to a channel leading to Dead Horse Ditch or to the Laveen Area Conveyance Channel.

The HV watershed has a major unnamed wash at the bottom of the valley. Adjacent to this channel and along this channel is where the notable problems exist for the HV watershed. The upstream portion of the channel receives storm water flows from small collector washes that convey the flows from the mountains to the upper wash location. These collector washes cross Carver Road in various locations causing road flooding. From this point the wash traverses though private land, mostly developed with desert landscape or left natural, until it reaches Carver Road again. At this point, the wash is directed at two homes on the south side of Carver Road. These homes have experienced past flooding problems as indicated by the small earthen berms surrounding them to direct storm flows around the homes. The water then flows through a group of rural or ranchette homes eventually reaching Estrella Road and flowing west to the reservation boundary. The engineering functional group developed several concepts for conveying the storm water around these homes in a channel and discharging it to the existing channel that leads to Dead Horse Ditch or to a channel leading to the Laveen Area Conveyance Channel. A basin near 47th Avenue and Estrella Road, upstream of 51st Avenue, would regulate peak flows entering the reservation.

The MD watershed, the watershed that drains to the Laveen Area Conveyance Channel, is the largest watershed in the project. The South Phoenix/Laveen Drainage Improvement Project and Laveen Area Conveyance Channel Project provided solutions for a majority of the flooding problems. Remaining flood problem areas were evaluated by the engineering functional group. Problem areas include the historical Laveen area on southeast corner of the intersection of 51st Avenue and Dobbins Road. Various locations in this section have been flooded due to low areas, raised canals or ditches and elevated roadways. Other areas with notable flooding problems include 67th Avenue between Baseline Road and Southern Avenue, the intersection of 51st Avenue and Baseline Road, and the intersection of 51st Avenue and Elliot Road. The group concluded that seed ideas for preventing flooding in the areas would include storm drains for roadway flooding including 67th Avenue and the intersections of 51st Avenue with Baseline and Elliot Roads. A collector channel, maybe upstream of the Western Canal, would collect flows off of Carver Mountain and discharge into basin(s) in the undeveloped portions of Laveen east of 47th Avenue, south of Dobbins Road. These basins and storm drains could be discharged directly to the Laveen Area Conveyance Channel or taken to the west and intercepted by a channel along the reservation boundary, eventually discharging to the Laveen Area Conveyance Channel.

During discussion of the various options, the group took into account the implication of the proposed Loop 202 Transportation corridor alignment through the middle of the Laveen ADMP study area. The transportation corridor location is subject to change and will not be constructed until some time in the future. The systems proposed by the group could be easily modified to fit within the plans for the ultimate transportation corridor location. The current proposal for transportation corridor off-site drainage is to locate a collector channel on the upstream side of the transportation corridor to collect and convey the flows away from and through the alignment.

Multi-Use Seed Idea Pre-Meeting Summary

The objective of this functional group was to develop concepts and ideas that could incorporate multiple use opportunities into the Laveen Area Drainage Master Plan alternatives. General information on current and underway plans in the Laveen area were reviewed and presented. Participants discussed these plans, and agreed to the following principles that were used to guide the development of four alternative sets of seed ideas:

- Co-locate basins and channels that integrate existing plans:
  - Watercourse Master Plan
  - Phoenix General Plan Trails (i.e. Baseline-Dobbins Scenic Drive)
  - Parks obtained through zoning dedications and Southwest Area Plan parks policies
  - Maricopa Trail (Sun Circle Trail)
  - South Mountain Park Master Plan (Trailheads)
  - River Plans (Rio Salado, El Rio)
- Incorporate the Western Canal.
- Incorporate the Laveen Area Conveyance Channel.
- Connect rivers to mountains (using flood control and other features).
- Use an approach that minimizes the impacts of trails to existing and planned project design.

Based on these principles, the seed ideas were developed. These ideas are intended to provide a framework for presenting recreation opportunities. The group felt that the final Area Drainage Master Plan recommended alternative would likely contain elements from many, if not all of the seed ideas.

Multi-Use Only Seed Ideas

These ideas are based on thinking about recreation as the most important element to guide planning and stormwater management decisions in the Area Drainage Master Plan.

The seed ideas based on this premise would include:

- Trails and recreation features that are compatible with equestrian use.
- Emphasis on :
  - Sun Circle Trail/Maricopa Trail.
  - Salt River and Gila River connections to other trails/recreation.
  - Access to South Mountain Park.
  - Connections to Gila River Indian Community.
  - Connections to county parks (via other trail systems).
  - Golf courses incorporated into open space areas used for flood control/stormwater management.
  - New neighborhood parks.
  - Equestrian facilities as a part of flood control facilities.

Southwest Area Plan Seed Ideas

The Southwest Area Plan, adopted in 1998, reflects the values and desires of Laveen residents. Because it is an adopted document, and incorporates other, adopted plans and is part of the City's General Plan, a set of seed ideas that implemented the goals of this plan were developed. They include the following elements:

- Trails and recreation features that are compatible with equestrian use.
- Emphasis on:
  - Sun Circle Trail/Maricopa Trail
  - Salt River to Gila River connections
  - South Mountain
  - New neighborhood parks.
  - Equestrian facilities combined with flood control.
  - Retain views of mountains (the Estrellas, South Mountain, Carver Hills).
  - Restore the Salt River corridor.
  - Using water features to remind us of and represent natural elements such as washes.
  - Preserving the agricultural character of Laveen.
  - Rural recreation activities.
  - Preserving historic and prehistoric land uses and features (for example, a planted area representing crops, windbreaks or vegetated promenades).

Landscape Seed Idea Pre-Meeting Summary

The focus of the Landscape functional group was based on developing seed ideas that would incorporate characteristics appropriate for the Laveen environment and visual character.

The ideas developed provide the essential elements that the functional group considers to be imperative in the development of alternatives for the Laveen ADMP. They are classified in two major areas and should be considered as an outline of elements to be used in coordination during the development of alternatives.

Natural Systems Elements

These elements were predicated on preserving and restoring natural systems as the guiding framework for developing a stormwater management approach for the Laveen Area Drainage Master Plan. The key features include:

- Salt River and Gila River connections
- South Mountain Park
- Carver Hills
- Wildlife habitats (potential is significant)
- Preserve the views of the mountains (Estrellas, South Mountain and Carver Hills)
- Restoring the Salt River corridor
- Using water features to remind us of and represent natural elements such as washes

Cultural Elements

Culture in this context was viewed as the equestrian emphasis of the community, it's rural feel imparted by the farms, open views and linear landscapes, and low development densities. The elements presented here are intended to preserve these cultural features of the community. They include:

- Preserving views of city, farms, silos/bars/cotton gins and canals Designing flood control to incorporate exiting features
- Trails and recreation elements that are compatible with equestrian use

- Emphasis on:
  - Sun Circle trail.
  - Gila River Indian Community.
  - Providing equestrian facilities as a part of flood control.
  - Preserving the agricultural character of Laveen.
  - Rural recreation activities.
  - Preserving historic and prehistoric land uses and features (for example, a planted area representing crops, windbreaks or vegetated promenades).

Environmental Seed Ideas Pre-Meeting

The purpose of the group meeting was to develop those environmental concepts and elements that could be incorporated into the Laveen ADMP alternatives. Team members involved in the environmental functional group discussed the information discovered during the existing condition analysis. Elements of the existing conditions within the environmental influence include:

- Fish and Wildlife Service list of threatened and endangered species.
- Arizona Game and Fish list of species of concern and special status species.
- Hazardous-material database information.
- Archaeological surveys and data collection.
- Section 404 discharge into waters of the U.S.
- Data from agencies within the area.

In the process of determining flood control alternatives for the Laveen ADMP, avoiding impacts was the general goal. In addition, alternatives must be evaluated based on either "minimizing" and/or "mitigating" those impacts when avoidance is not practicable. The environmental group agreed to bring a mutual consensus of actions on some definite issues and apply a broad-brush approach in order to keep the group sensitive to those issues/needs when the preferred regional flood control alternative becomes selected.

Biological Seed Ideas

Most all the native desert vegetative community has been replaced by vegetation indicative of the agrarian lifestyle in the Laveen study area. The natural vegetation as it currently exists is so discontinuous that it does not support well-defined wildlife corridors within the study area. The environmental group believes the integration varied-use, wide-corridor alternatives into the new flood control features would enhance or at least maintain the wildlife in the area and certainly not lead to further habitat degradation. As the area becomes even more urbanized these multi-use opportunity corridors can serve as buffers and habitat for those same species that are in place now.

Elements of these ideas were predicated on preserving or enhancing native desert vegetation whenever possible. Several of the ideas will be adopted based on the success of activities that are currently being undertaken on other Flood Control District projects. One such activity is the placement of manmade burrows to entice burrowing owls like those along the proposed Laveen Area Conveyance Channel.

The district may choose to purchase additional acreage outside the channel or right-of-way limits to leave as agricultural land allowing for fallow fields that some of the wildlife are associated with or even allowing for local community garden plots. Where practicable, in the invert areas of low flow channel, plans could allow for larger flow capacities, which would allow for greater diversity of vegetation, subsequently greater wildlife diversity. Finally, the use of non-structural alternatives when possible would create esthetically softer features that are more pleasing to humans and wildlife alike.

Archaeological Seed Ideas

One of the main environmental issues that should be anticipated consists of features, which are not visible or readily visible in the area today. To gain a better understanding of what features may be anticipated, review of existing archaeological survey maps took place to determine those areas that have already been surveyed. The surveys generally tend to be along roadway alignments or other linear corridors. Only a small amount of land within the drainage area has been surveyed and the potential for cultural resources is high based on the area's proximity to previously identified archaeological sites.

It is the general consensus that this area was probably widely inhabited in prehistoric times based on the proximity to the confluence of the Salt River and Gila River immediately west of the area. Furthermore, known historic canals that have been recorded in the area and three major prehistoric villages were also documented. The general areas the three prehistoric villages occupied are known, however, actual delineation of these villages has not been conducted.

Based on the environmental framework, an attempt to locate an alignment directly through a known archaeological site should be avoided. When practicable, aligning the flood control features along existing corridors or alignments (roadway, canals) would generally mean fewer disturbances to the area. A reevaluation is recommended for those areas surveyed in 1987 along 51st Avenue for the ADOT South Mountain corridor. While avoidance is the primary goal, incorporating significant features into a diverse educational/ recreational function could constitute some of the mitigation measures that would be required if the selected alternative affects cultural sites.

Hazardous Materials Seed Ideas

No major hazardous-materials sites were located within the project area, therefore none are likely to impact the recommended alternative. Even a few sites identified in the database search, which tend to be concentrated around 51st Avenue and Dobbins Road, would not likely affect the alternatives.

A more thorough evaluation would be required if property transactions for an acquisition of a building or residential home would take place. It is not uncommon for illegal drug labs to have been set up in many areas of the valley including the Laveen ADMP study area. Also, older buildings/homes may have asbestos containing material or lead base paints, which must be properly identified and handled. It would be incumbent on the buyer to perform their due diligence before acquiring any property.

Section 404 Seed Ideas

The Section 404 Clean Water Act implication is minimal. The potential for permits is most likely along the 67th Avenue right-of-way or possibly across the Gila River Indian Community. The actual type of permit required, whether Nationwide or Individual, can not be determined until final designs are developed.

ALTERNATIVES FORMULATION WORKSHOP

The Alternatives Formulation Workshop was divided into three activity segments:

- Information sharing and presentation of seed ideas developed in the functional group pre-meetings.
- Identification of planning goals.
- Development of alternatives.

Information Sharing and Presentation of Seed Ideas

A representative of each functional group provided a brief overview of their respective topic area and identified the most exciting opportunities and challenges they believe existed in their specific discipline. The overview included facts that were determined to be critical to providing multiple use flood control facilities in the Laveen study area.

Identification of Goals, Objectives and Policies

A planning goal is a desired condition. It is very general, and speaks to the basic needs that are to be addressed. An objective is a desired level of achievement or measurable step towards achieving a goal.

A policy is a step that could be taken by the District, the City of Phoenix, or another entity to reach the objectives and achieve its goals.

The Alternatives Formulation Workshop participants were asked to identify those factors that they felt were important to be considered in creating an Area Drainage Master Plan, that protected the public from the hazards of flooding, served multiple purposes and improved the quality of life for Laveen residents. The following factors were identified:

Figure 3-2: Planning factors are identified

Core Factors (must be included in any alternative)

- Provide flood control.
- Implementable (realistic).
- Fundable.
- Operations & Maintenance.

Planning Factors

- Plan and design flood control facilities to meander and achieve natural appearance.
- Avoid co-locating facilities in utility corridors.
- Integrate and connect with planned and existing trail and recreational systems and provide new facilities where necessary.
- Work with GRIC for mutual benefits and integrate GRIC storm water issues into the plan.
- Preserve views and vistas to the mountains.
- Consider utility impacts and below surface infrastructure.
- Meet needs/desires of Laveen citizens.
- Protect, enhance, and create wildlife corridors.
- Coordinate planning with the planned transportation corridor (Loop 202) corridor.

Figure 3-3: Goals are developed from planning factors

Design/Engineering Factors

- Evaluate non-structural solutions, purchase flooded areas, and maintain as retention.
- Design structures to allow vegetation to grow in inverts, basins, channel banks, etc.
- Design to be consistent with existing and future land use.
- Store water out of SRP canals or enlarge canals to handle storm water.
- Incorporate wildlife habitat into solutions.
- Design structures and facilities that minimize operations and maintenance.
- Explore the potential/capacity for the subsurface disposal of water.
- Consider the potential for shallow groundwater in the area.

Construction Factors

- Obtain sufficient ROW to integrate aesthetic features.

Implementation/Funding Factors

- Cost-effective, ability to fund.
- Conduct historic building surveys and protection plan, avoid historic and pre-historic sites.
- Preserve and maintain agricultural land and character.
- Post usable maps to identify wildlife habitat areas, major natural flow patterns, and historic areas to developers and engineers with ease of access.

Development of Alternatives

Once the goals were identified, the participants were assigned to groups at tables ranging from five to seven members. The groups were structured so that a variety of experts were included at each table. Each group was asked to develop alternative concept Area Drainage Master Plans that accomplished as many of the factors as possible. A total of 18 plans were developed during this process.

Figure 3-4: Presentation of conceptual alternatives

When the alternatives developed at each table were presented to the entire 40 person audience, the following key considerations emerged:

- The Plan can establish a drainage pattern for Laveen that will be considered in other projects (e.g. 202 Transportation corridor) – All the groups felt that the ADMP was an important opportunity to establish a long-term drainage pattern for the area.
- A potential to work with ADOT exists to use a channel to protect the transportation corridor.
- There is a need to find a corridor that minimizes impact to individual allotted lands on the Gila River Indian Reservation.

All of the groups recognized the potential for Laveen to impact the Gila River Indian Community. They all worked on drainage solutions that would have the least impact to this entity.

- There is a potential for Gila River Indian Community agricultural lands to develop. All of the groups recognized that current plans on the Gila River Indian Community adjacent to Laveen were for agricultural uses. However, everyone also recognized that this is a well-located area, and that these plans could change, especially with the improved access provided by the transportation corridor and the land tenure pattern on the GRIC.

The following features were generally reflected in most of the plans:

- Basins at trailheads – Retention basins were considered opportunities to provide trailheads identified in the South Mountain Park Plan and Southwest Area Growth Study.

- No changes to drainage patterns associated with the alluvial fan at South Mountain - Many alternatives displayed the consensus that the existing development patterns and the proximity to South Mountain Park merited a non-structural approach to this area.

- Channel/Trail/ Wildlife corridor along GRIC boundary with the City Of Phoenix – The Sun Circle Trail follows the transmission line easement along the GRIC boundary with the City of Phoenix. Because of the historic importance of the Sun Circle Trail, and current County efforts to implement it, most plans identified this as an important trail corridor that could be compatible with a drainage corridor.

- Use Western Canal, Telegraph Pass as drainage and/or trail corridors – The SRP laterals on the north and south sides of the Carver Hills are known as the Western Canal and Telegraph Pass Canal, respectively. Both of these laterals are identified in the Southwest Area Growth Study and other plans as trail corridors. They are also important because they are raised features, and have an impact on stormwater flows. These laterals were seen as excellent locations for drainage corridors that could also provide trail corridors.

- Convey flows along 67th Avenue north to the Salt River – 67th Avenue is a low spot and is perpendicular to the Salt River. Most alternatives felt that it was a cost effective and appropriate solution to convey water from the high point north along 67th avenue through a channel or pipe to the Salt River.

- Vegetation promenade along Dobbins Road – The Laveen Watercourse Plan, the Southwest Area Growth Study and the Phoenix General Plan identify Dobbins Road as a part of the Baseline-Dobbins Scenic Drive. The Laveen Elementary School, which has experienced significant flooding, is located at 51st Avenue and Dobbins Road. Many alternatives recommended creating a multiple purpose drainage corridor along Dobbins Road that would alleviate flooding at the school and implement the scenic drive.

- Basins at Laveen Elementary School at 51st and Dobbins/ new town core – The Laveen Watercourse plan recommends that the Laveen Core be relocated east from 59th Avenue to 51st Avenue and Dobbins Road. The core is intended to be pedestrian friendly. A basin could be used to meter flows from Dobbins Road as well as provide an open space amenity that could lend character to the new town core.

- Parks/Schools Basin combinations – Basins were located at schools to increase opportunities for open space and recreation resources for the school and community.

- Wildlife corridors along drainage corridors – Drainage corridors were identified as opportunities to provide wildlife corridors between the South Mountains and Gila River. Both of these resources provide substantial wildlife habitat and provide connections to other habitat areas.

- Channel out of Hidden Valley Watershed (Hidden Valley Scenic Dr.) – The Dead Horse Ditch on the Gila River Indian Reservation provides a drainage channel to the Gila River. This is a logical route for water conveyed along the Phoenix/Gila River Indian Community Border.

- Routing channels through Laveen core – The Baseline-Dobbins Scenic Drive is viewed as a significant design element of the Laveen Core. The location at Dobbins Road and 51st Avenue is a low spot and floods frequently. Drainage corridors along Dobbins Road were viewed as opportunities to implement the scenic drive and enhance the core.

- Use planned off-site drainage system along the Loop 202 Transportation corridor – The planned Loop 202 will have off-site drainage systems along it. These systems were viewed as opportunities to remove stormwater without providing additional facilities.

- Open channels with trails – Almost every alternative considered drainage corridors as an opportunity to provide trail corridors throughout the community. Many of the channels were designed to complement the planned trails system.

- Buying homes in Hidden Valley to preserve and restore natural wash – Hidden Valley is rife with homemade drainage solutions that have downstream impacts.

The 18 alternatives developed and presented during the Alternatives Formulation Workshop can be summarized as follows:

<u>Alternative 1:</u>
The Southwest South Mountain (SWSM) basin was given a "no action" status. The Telegraph Pass basin would be studied and any flooded homes would be purchased to allow the land to naturally convey the flows. A storm drain along 51st Avenue to the Laveen Area Conveyance Channel with two detention basins was the primary feature. The 67th Avenue basin was a storm drain along the roadway towards the Salt River.

<u>Alternative 2:</u>
This alternative included a linear retention basin for the SWSM watershed with a pump station to convey flows to the north into a channel that parallels the Gila River Indian Reservation (GRIC) border. The Telegraph Pass basin would include channels within the basin to a detention basin at its base and a pipeline to the west towards the channel along the GRIC border. This option also included connection of trailheads to the South Mountain area. The central area included a detention basin at 45th Avenue and Dobbins Road that conveys flows westerly to a detention basin at approximately 55th Avenue serving as a regional amenity. The flows then go due west to the channel along the GRIC border. 67th Avenue includes a detention basin with a storm drain north to the Salt River.

Alternative 3:
This alternative included a basin for the SWSM watershed with a pipeline to the west towards the Gila River. The Telegraph Pass area would have a basin at its base and a pipeline to 51st Avenue where a storm drain flows to the south. There would be two detention basins along 51st Avenue, one at Dobbins Road and another at Baseline Road. At 67th Avenue there would be a detention basin with a pipeline north to the Salt River.

Alternative 4:
This alternative includes a basin at the SWSM watershed with a channel to the west towards the Gila River. The Telegraph Pass area would have a channel through its reach that ties to a basin at its base. A channel then meanders south to Dobbins Road where it meets two channels that circle the Elliot/Dobbins area with a detention basin near Dobbins and 45th Avenue. The channel would combine soft and hard bottoms compatible with equestrian and pedestrian uses. The channel would continue south parallel to 51st Avenue to a detention basin at Baseline Road before being tied to the Laveen Area Conveyance Channel.

Alternative 5:
No action was recommended at the South Mountain alluvial fan. A storm drain or channel would parallel the Loop 202 Transportation corridor with multiple use amenities. At Carver Hills, the natural wash would be restored and homes would be bought. Lateral 12.8 would branch out into two separate channels at approximately 35th Avenue with the southern branch heading west to the Gila River along Elliot Road. This channel would have two basins, one at approximately 43rd Avenue and one at approximately 47th Avenue. Carver Wash will be restored and the existing homes within that area are to be purchased.

Alternative 6:
Under this alternative, the South Mountain alluvial fan area is to be preserved. Create proposed "Hidden Valley Channel" as an extension of Lateral 12.8 headed southwesterly to Estrella Road and draining to a channel along the GRIC boundary, South Mountain/Gila River Recreational Corridor. This channel along the GRIC will serve as a wildlife corridor with islands (habitat sites). The town core or Laveen Town Recreational Complex would be located at the southwest corner of 43rd Avenue and Dobbins Road. A channel, Dobbins Road Promenade Channel, heads west from the Recreational complex along Dobbins Road toward the GRIC boundary. At 67th Avenue, a storm drain or channel will drain flows south to the Laveen Area Conveyance Channel.

Figure 3-5: Presentation of conceptual alternatives

Alternative 7:
This alternative proposes a channel along the GRIC boundary towards the Salt River. A multi-use channel, the Maricopa County Regional Trail Channel Corridor, will follow the Western Canal alignment passing through the Laveen Recreational Complex located at approximately 43rd Avenue and Dobbins Road. The proposed Hidden Valley Channel would connect to the GRIC boundary with a recreation node located at the connection. In addition, a recreational node will also be located at the town core located at approximately Olney Road and GRIC boundary. A third recreational node will be located at the Laveen Area Conveyance Channel and the GRIC boundary.

Alternative 8:
Basins are proposed at the South Mountain trailheads with parking facilities (see Figure 3-6) and a new trailhead is proposed at South Mountain and GRIC border. Two additional basins will be located at the east and west bases of Carver Hills. A canal connects these basins and drains to the GRIC boundary where another canal is located. SRP canals south of Carver Hills would be extended/ enhanced to convey storm flows.

Alternative 9:
This alternative includes a channel along the Loop 202 Transportation corridor including equestrian, hiking/pedestrian, and storm flows (see Figure 3-6). A basin at the Laveen Elementary School is also proposed.

Alternative 10:
A channel along the GRIC boundary is proposed with a wildlife corridor. A golf course used for detention is proposed at Baseline Road between 51st and 59th Avenues. Schools are to be utilized for detention.

Alternative 11:
Basins are proposed at the South Mountain trailheads with parking facilities. A canal and trail along Carver Hills wash connects the trailheads. SRP canals are to be extended/enhanced south of Carver Hills towards GRIC boundary and around the "Conservation Community". The town core located at 51st Avenue and Dobbins Road includes a basin and a park. A channel parallels the Loop 202 Transportation corridor. Additional channels including wildlife corridors will connect the South Mountain trailheads to the Salt River trailheads.

Alternative 12:
This alternative proposes a channel along the GRIC boundary from a high point located at the southern portion of the boundary to the Salt River. Another channel is proposed at 51st Avenue headed westerly along Dobbins Road to GRIC boundary. This channel passes through the Laveen town core providing multiple-use amenities. A storm drain system along 51st Avenue from Olney Road to the Laveen Area Conveyance Channel conveys storm flows along 51st Avenue. An additional storm drain along Olney headed west to 51st Avenue ties into this system. At 67th Avenue, a storm drain will convey flows north to the Salt River. At the SWSM watershed, a channel draining west into the Gila River conveys storm flows.

Alternative 13:
This alternative proposes to extend/enhance SRP laterals to convey storm flows. Highline canal branches out and connects to the GRIC border. A canal runs along the GRIC border to the Salt River.

Alternative 14:
SRP canals are to be extended/enhanced to convey storm flows. A channel extending from the Western Canal heads west towards the Gila River along Elliot Road. A channel is proposed along Dobbins Road headed west to the GRIC boundary. A storm drain extends from 43rd Avenue to 51st Avenue along Dobbins Road to the canal. An additional storm drain along 51st Avenue south of Olney Road towards Dobbins Road ties in. At 67th Avenue, a storm drain conveys flows north into the Salt River.

Alternative 15:
Channel upstream of the SRP canal (see detail) runs from a basin located at the mining site (Carver Hills). An additional basin is proposed at the Cheatum property (47th Avenue and Elliot Road). An open channel system including scenic elements is proposed along Hidden Valley watershed connecting detention basins and planned school (also used for detention). The open channel system connects

to the Loop 202 Transportation corridor at approximately 57th Avenue and Dobbins Road where another basin is located. The transportation corridor will consist of a trail system that will connect the South Mountain trailhead with the Salt River trailhead, which will be moved to 67th Avenue.

Alternative 16:
This alternative focuses on providing detention facilities where possible. Town core will be located at 59th Avenue and Dobbins Road. Basins will be located at the town core, Baseline Road and 51st Avenue, Dobbins Road and 51st Avenue, Cheatum property, east and west bases of Carver Hills, and 43rd Avenue and Estrella Road. The basins at Carver Hills will be connected to the SRP laterals at the base of Carver (Telegraph Pass area). A trail/open channel system connects the town core to the Highline Canal.

Alternative 17:
This alternative follows the natural flows based on open channel systems. South Mountain is to be preserved (establish policies). A channel is proposed from South Mountain headed west towards the Gila River. Homes along Carver Road would be purchased. An open channel system (including trail system) would extend from 43rd Avenue and Carver Road to the Gila River. An additional channel will connect the Western Canal to the Laveen Area Conveyance Channel past the town core. Another channel will convey flows from 57th Avenue and Olney Road to the Laveen Area Conveyance Channel. 67th Avenue would be raised to ground level to prevent flooding.

Alternative 18:
This option protects SRP canals, provides parks, and re-establishes the natural drainage of the area. The SRP laterals (Telegraph Pass and Lateral 12.8) will be enhanced to convey storm flows and provide trails. Three basins will be located around the Telegraph Pass area. One at Carver Road between 35th and 43rd Avenues, another at Estrella Road and 43rd Avenue, and a third at Estrella Road and 47th Avenue. These basins are connected to the SRP canals, which will drain to the transportation corridor channel. A basin will be located at the town core with a connection to another basin just east of it. A channel running northwesterly from a basin at the Cheatum property (47th Avenue and Elliot Road) connects to the Laveen Area Conveyance Channel. Two other basins will be located at 51st Avenue and South Mountain Avenue and South Mountain Avenue between 67th and 75th Avenues.

Combined Alternatives

Many of the 18 concept alternatives developed in the Alternatives Formulation Workshop had features in common with each other. In order to reduce the number of concept alternatives to a manageable number, a core team with representatives from each of the functional groups combined the common elements of the concept alternatives and produced six formal alternatives. A digital sketch of each of the resulting six formal alternatives was produced, along with a narrative description. These are represented on the following pages.

PUBLIC PARTICIPATION

A public open-house meeting was held on February 20th, 2001 to present the six formal alternatives to the public. The Alternatives Formulation process of the Area Drainage Master Plan was described in a second newsletter. The six formal alternatives were also presented to the Laveen Village Planning Committee and to the Gila River Indian Community's Vee Quiva Casino Board of Directors for informational purposes.

Alternative 1 – Linear Concept

This alternative mainly uses drainage channels within multi-purpose right-of-ways to achieve flood control. The drainage channels would be shallow and wide with a defined low-flow channel. The channel bottom and side slopes treatments would be compatible for multi-use purposes and probably support a system of multi-use trails and other linear recreational opportunities.

The linear, multi-use channels would divert flows to the west of the upper two watersheds. One channel would run parallel along Carver Hills just upstream of the Western Canal, and eventually outfall to Dead Horse Ditch. A second channel will run through the Telegraph Pass area, west to Estrella Drive. Areas on the south side of South Mountain Park would continue to cross the Gila River Indian Reservation boundary as it currently does.

Another multi-use channel would run along Dobbins Road from 43rd Avenue, then west to the Gila River Indian Reservation. It would continue north, outfalling to the Laveen Area Conveyance Channel as part of a Dobbins Road Scenic Drive.

A focus of this alternative is that the multi-use channels are tied into the South Mountain Park trailheads using some fashion of detention basin or stormwater collection feature. Raising the grade of 67th Avenue to match surrounding grades would control flooding. Storm flows would then be channeled north to the Salt River.

Figure 3-6: Alternative 1 – Linear Concept

Figure 3-7: Typical Cross-section

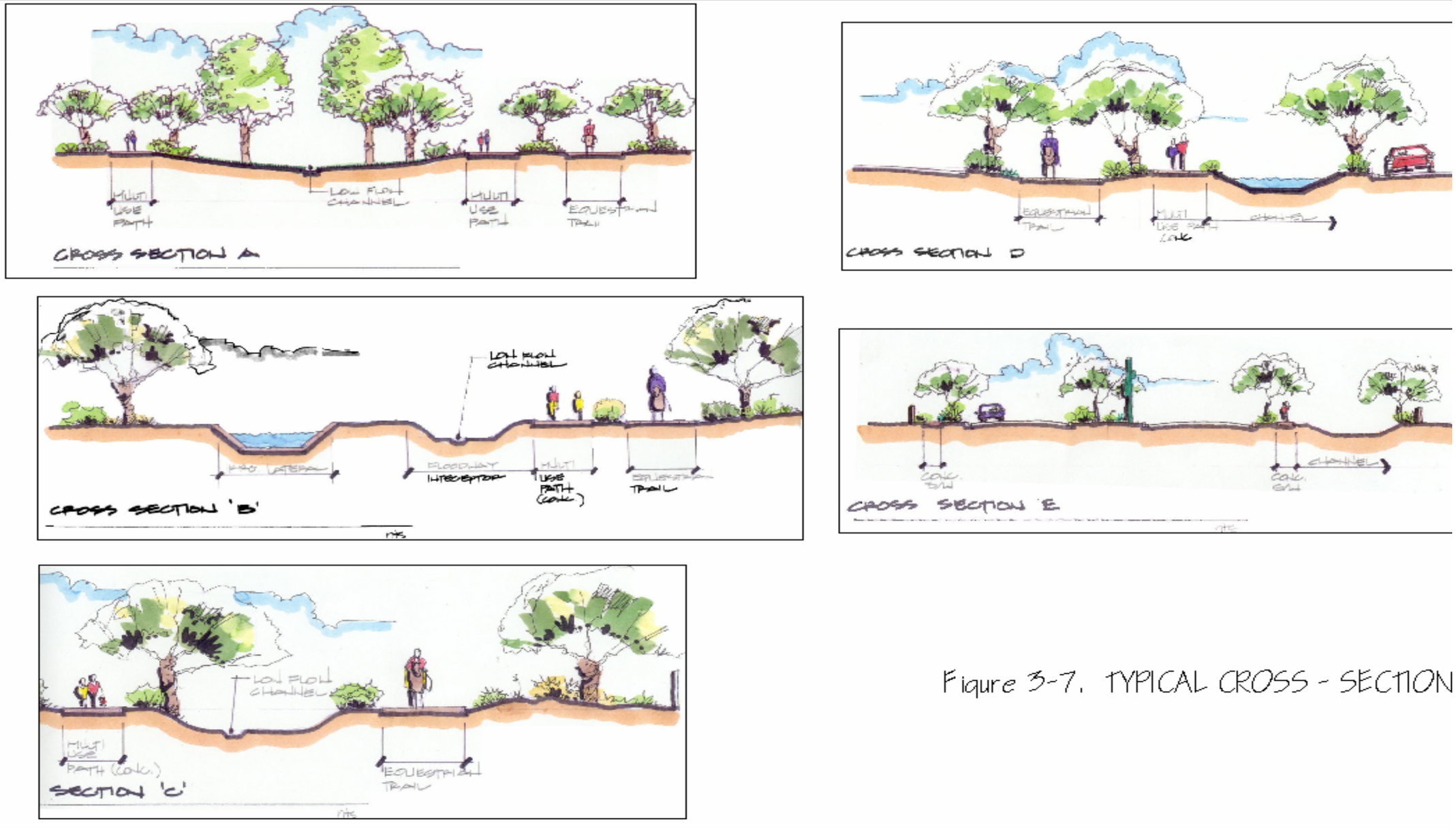


Figure 3-7. TYPICAL CROSS - SECTION

Alternative 2 – "Break the Grid"

This alternative breaks the traditional grid established by the street system, allowing multi-use drainage channels to meander, providing for more parks and amenities. The alignments shown tie the stormwater system to the Laveen Core area while not being confined to the roadway alignments. The multi-use channels through the Laveen Core at Dobbins Road will serve to enhance the Dobbins Road Scenic Drive between 51st and 59th Avenues. Flows then continue along Dobbins Road to the Gila River Indian Reservation boundary, then north to the Laveen Area Conveyance Channel.

Flooding along 67th Avenue is controlled by piping or channeling north to the Salt River, or south to a proposed detention basin as an amenity to a planned school.

The South Mountain Park watershed area would continue to flow south across the Gila River Indian Reservation boundary as it currently does.

Alternative 3 – Detention Basins

This alternative uses a combination of multi-use drainage channels and multi-use detention basins. The addition of detention basins at selected locations will serve to reduce peak flows, thus allowing the width of the drainage channels to be downsized. The downsized drainage channels could either outfall to the Laveen Area Conveyance Channel or to the drainage system included in the proposed Loop 202 transportation corridor.

Multi-use channels will follow along Dobbins Road, the Western Canal, Telegraph Pass, and the proposed Loop 202 transportation corridor. Stormwater from the south side of South Mountain Park will be collected in a detention basin, and pumped to the proposed Loop 202 drainage system.

Storm flows along 67th Avenue will be collected and from a high point in the system, will be either piped north to the Salt River or south to the Laveen Area Conveyance Channel within a local storm drain system.

Figure 3-8: Alternative 2 – "Break the Grid"

Figure 3-9: Alternative 3 – Detention Basins

Alternative 4 – Storm Drain Concept

This alternative focuses on the use of a network of street catch basins and storm drains to collect, control and convey floodwaters. Strom drains will be located north along 51st Avenue, outfalling to the Laveen Area Conveyance Channel, and west along Dobbins Road, outfalling to the proposed Loop 202 drainage system. A storm drain along 67th Avenue could outfall either to the Salt River or to the Laveen Area Conveyance Channel. Detention basins would be located in the existing Laveen area to collect flows before being metered to the storm drains.

Multi-use channels and a possible detention basin would collect flows along the Western Canal and along Telegraph Pass. The Western Canal Channel would flow west to a storm drain in Elliot Road and then north to the Laveen Area Conveyance Channel. The Telegraph Pass Channel would flow west to Estrella Drive, continuing to a storm drain which outfalls across the Gila River Indian Reservation boundary and channeled west to the Gila River.

Floodwaters from the south side of South Mountain Park will be collected and channeled west to the Gila River.

Alternative 5 – "No Action"

No structural flood control projects would be built with this alternative. Only the Laveen Area Conveyance Channel, built with developer participation, would be in-place to serve flood control needs. All existing flood control policies currently enacted by the City of Phoenix and the District would assume to be in force.

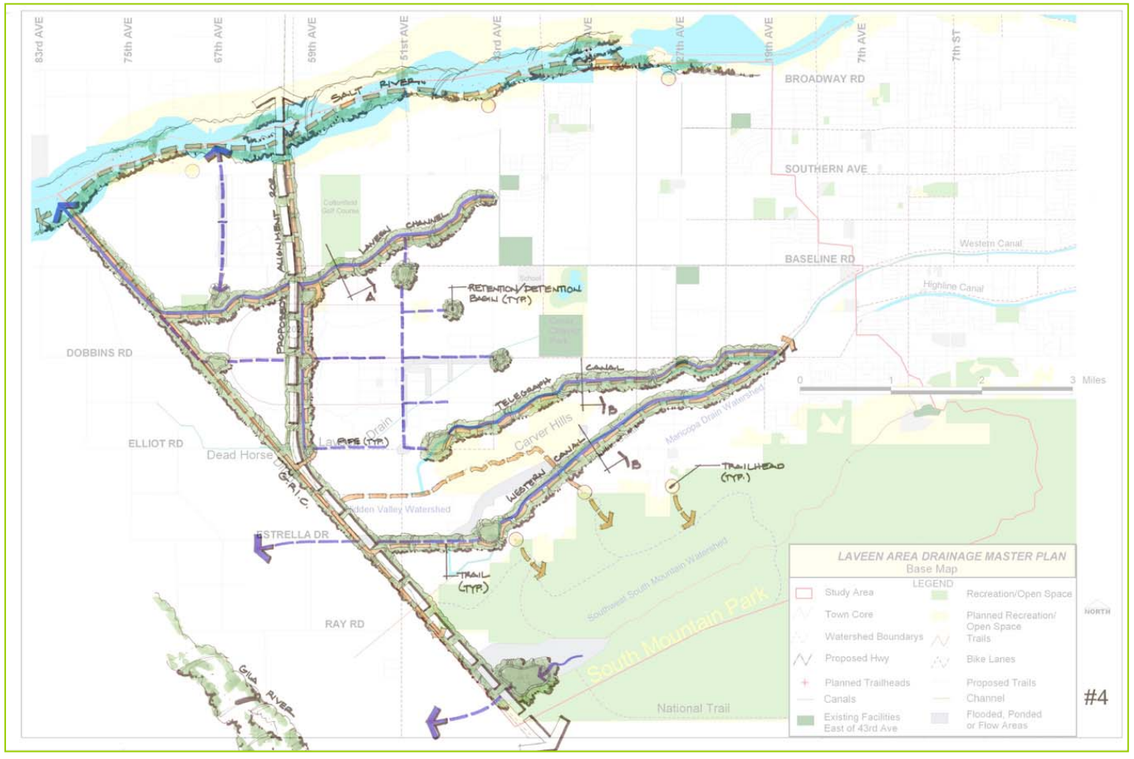


Figure 3-10: Alternative 4 – Storm Drain Concept

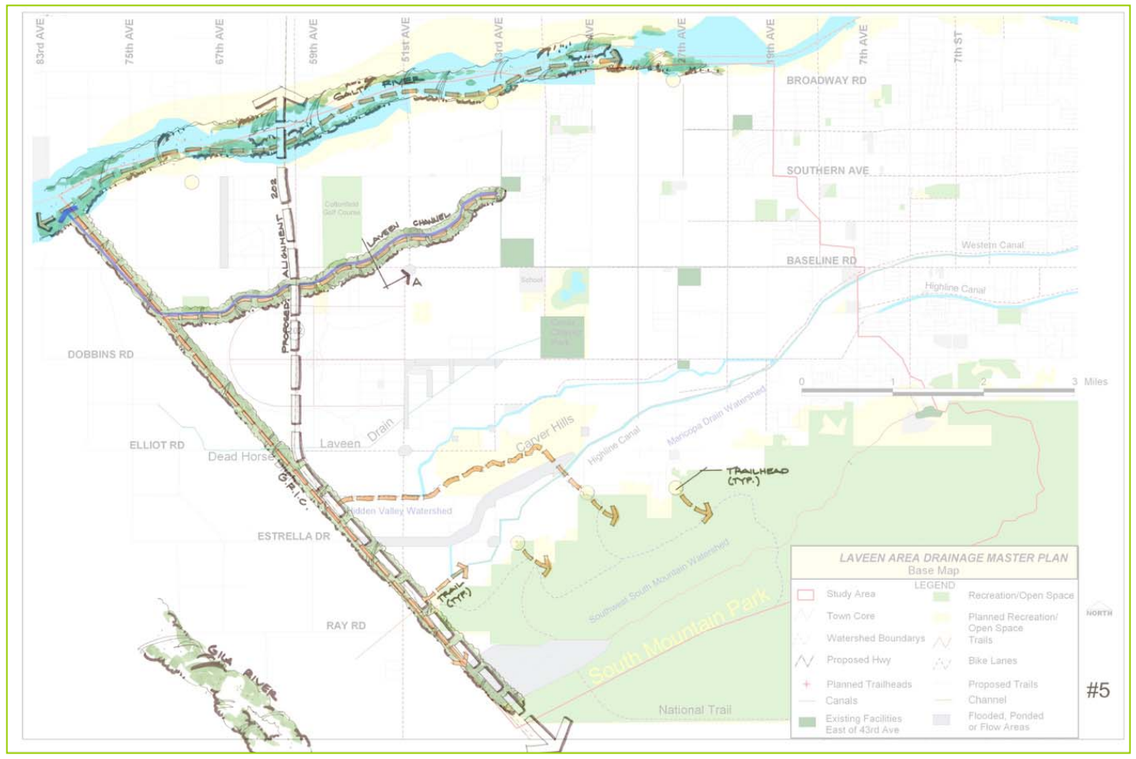


Figure 3-11: Alternative 5 – "No Action"

Alternative 6 – Minimum Structural

With this alternative, only the minimum amount of improvements necessary to provide regional flood protection would be built. The opportunities for multi-use trails, parks, and other recreational and aesthetic enhancements would be minimized.

Storm drains will be constructed within the Laveen Core area to convey flows to 51st Avenue, then north to the Laveen Area Conveyance Channel protecting the Laveen Elementary School and the existing Laveen area. This system would also include a detention basin at 51st Avenue and Baseline Road to detain flows and reduce the peak discharge to the Laveen Area Conveyance Channel.

A collector channel behind the Western Canal would convey flows to basins near 43rd and 47th Avenues to protect flooding areas identified from 43rd Avenue to 51st Avenue.

Flows from along Telegraph Pass would be conveyed through either a storm drain or an open channel to a detention basin, ultimately outfalling to an existing channel.

EVALUATION CRITERIA

For each functional group, a number of goals and objectives were defined based on discussions from previous meetings and the Alternatives Formulation Groups. These goals served as the basis for developing the evaluation criteria by which the combined alternatives would be assessed. The major goals for each functional area included:

Environmental Considerations:

- Protecting, enhancing, and/or creating wildlife corridors
- Incorporating wildlife habitat into designs
- Protecting historic sites
- Maximizing protection of listed threatened and endangered species
- Minimizing 404 issues

Engineering Considerations:

- Providing localized and regional flood protection
- Providing flood protection for SRP system
- Providing flood protection GRIC
- Designing cost-effective and implementable solutions
- Minimize utility impacts
- Incorporating designs that allow vegetation growth
- Consistency with existing land use, planned parks, schools, and amenities
- Incorporate SRP canals
- Incorporate 202 Transportation corridor
- Minimizing operations and maintenance
- Developer needs

Multiple-Use Considerations:

- Meeting the needs of Laveen citizens
- Integration/ connections with existing/ planned trails
- Providing new trails and recreational opportunities
- Coordination with GRIC for mutual benefits
- Integration with City of Phoenix projects
- Coordination with future needs for open space

Landscape Considerations

- Preserving views and vistas to the mountains
- Preserving agricultural land and character
- Maintaining the equestrian character
- Preserving vegetative promenades
- Preserving character of Carver Hills

For these criteria, each alternative was evaluated based on how well they achieved the goal determined by the functional groups.

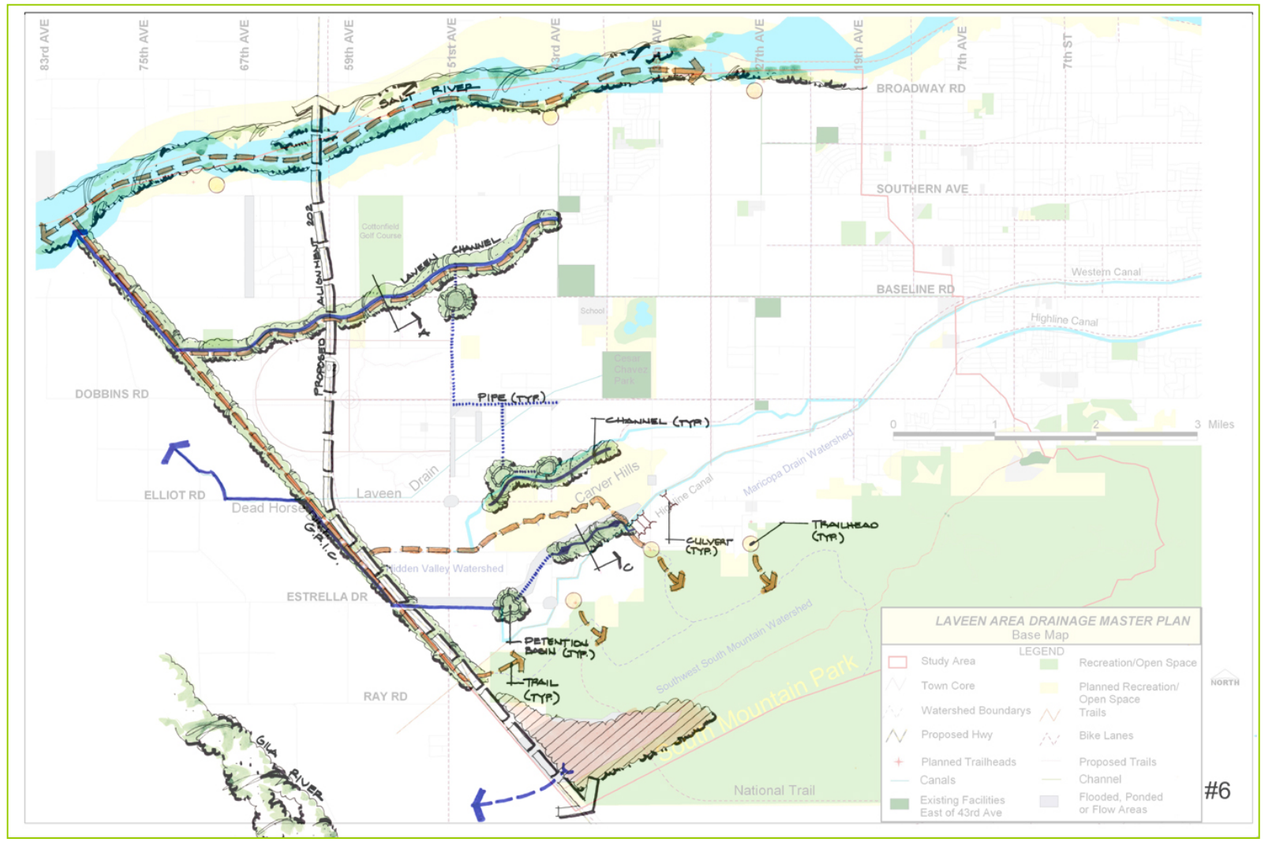
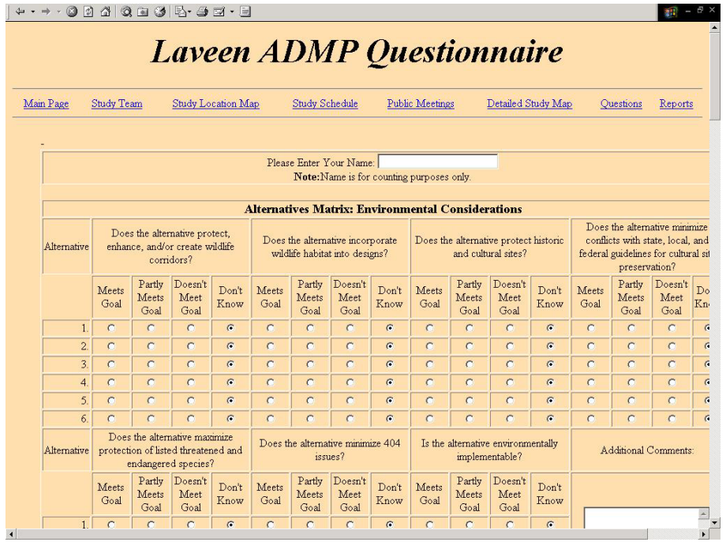


Figure 3-12: Alternative 6 – Minimum Structural

MATRIX SURVEY

A matrix was developed to evaluate each of the six combined alternatives based on the evaluation criteria. This format facilitated further comparisons among the alternatives. Each of the participants from the Alternatives Formulation Workshop was provided with web-based survey to evaluate the six alternatives. The survey was formatted using the evaluation matrix. Each participant was asked to determine whether the alternative met the goal, partly met the goal, did not meet the goal, or they did not know. In addition, they were offered the opportunity to provide comments for any of the functional areas. An excerpt of the web-survey is shown in Figure 3.12.



Laveen ADMP Questionnaire

Main Page | Study Team | Study Location Map | Study Schedule | Public Meetings | Detailed Study Map | Questions | Reports

Please Enter Your Name:
Note: Name is for counting purposes only.

Alternatives Matrix: Environmental Considerations

Alternative	Does the alternative protect, enhance, and/or create wildlife corridors?				Does the alternative incorporate wildlife habitat into designs?				Does the alternative protect historic and cultural sites?				Does the alternative minimize conflicts with state, local, and federal guidelines for cultural st preservation?			
	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Don't Know	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Don't Know	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Don't Know	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Do Kn
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4.																
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Alternative	Does the alternative maximize protection of listed threatened and endangered species?				Does the alternative minimize 404 issues?				Is the alternative environmentally implementable?				Additional Comments:
	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Don't Know	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Don't Know	Meets Goal	Partly Meets Goal	Doesn't Meet Goal	Don't Know	
1.													

Figure 3-13: Screen capture of web-based survey

A summary of the results of the web-based questionnaire is presented under each of the following functional areas.

Environmental

Based on the environmental goals, Alternatives 1 and 2 (Linear Concept and "Break the Grid", respectively) were considered to be the most favorable. These alternatives, being based on open channels, provide more opportunities to create wildlife corridors and habitats.

As expected, the overall results of this section revealed that Alternatives 4, 5, and 6 (Storm Drain Concept, No Action, and Minimum Structural) are the least preferable environmentally. Due to the limited open channels and amenities provided in these alternatives, they do not provide as many opportunities to enhance or create habitat or wildlife corridors. These alternatives, along with the others were considered to meet other environmental goals to a high extent such as being environmentally implementable and minimize regulatory issues.

In the area of cultural preservation, all alternatives were considered to meet the goals to a certain extent.

Engineering

Alternatives 4 and 6 were most favorable for meeting the goals in the engineering considerations. All the alternatives (except for Alternative 5, No Action) are considered to meet the main goal and fundamental purpose of the project, which is providing localized flood control. In the areas of regional flood control and flood protection for SRP, Alternatives 1 and 2 were the most favored. However, in meeting the goal of providing flood protection to the GRIC, Alternatives 3 and 4 were the most favored.

Alternative 6 was preferred for minimizing operations and maintenance as well as maximizing the use of the Laveen Area Conveyance Channel. All other alternatives, except for Alternative 5, No Action, partly met these goals.

Multi-Use
Based on multiple-use considerations, Alternatives 1, 2, and 3 were very well favored. They provide recreation opportunities, multiple use amenities, and coordinate with planned and existing recreation opportunities such as trails and parks. Of the action alternatives, the Minimum Structural Alternative, or Alternative 6, was the one that was considered not to meet some of the multiple use goals. Due to the maximization of the 202 Transportation corridor and the Laveen Area Conveyance Channel, this alternative does not provide for many new open channels or multiple use opportunities at the Laveen town core.

Landscape
For all the action alternatives, the Landscape goals were considered to be met with the exception of integration with existing dairies. It can be noted that Alternative 4 was not as well favored as the other action alternatives in the area of preserving the agricultural land character.

SUMMARY OF ALTERNATIVES

After tabulating the results of the web-based survey, a score was assigned to each functional area by normalizing the total responses for each alternative. A graphical representation of the survey results, based on this methodology, is depicted on the following figure.

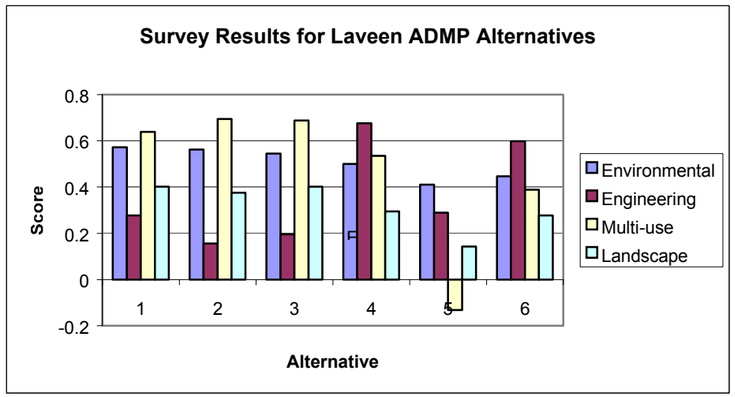

Figure 3-14: Survey results

From this graph, it can be observed that each alternative has its own relative strengths and weaknesses within each of the functional categories. Alternative 5, the "No Action" alternative did not seem to meet many of the key elements within the functional areas of concern. By providing many open channels and amenities, Alternatives 1, 2 and 3 seemed to be preferable within the Environmental, Multiple Use, and Landscape functional areas. Conversely, Alternative 4 was considered to excel in achieving the Engineering goals when compared to any of the other alternatives.

From these results, it can be concluded that a combination of the major features among the action alternatives would have to be considered in order to meet most of the goals established by the functional groups. Within the existing alternatives, Alternative 4 currently combines many of the key elements from the other alternatives and was ranked highest when the scores all functional areas are combined. Within later sections of the ADMP, the alternatives to be carried further in analysis will evolve from the combination of key elements observed in the six combined alternatives developed in this section.

COMPARATIVE STRENGTHS AND WEAKNESSES

Alternative 1 – Linear Concept:

Strengths:

- This alternative meets many of the Environmental goals by protecting, enhancing or otherwise creating wildlife corridors and habitats in the open channels.
- Within Engineering, this alternative not only meets the required flood protection goals for Laveen, SRP, and GRIC, but also allows for growth of vegetation at the channel inverts.
- With the many open channels in this alternative, the most of the Multiple-use goals are met including integration to existing trails and providing new trails.
- By providing open space amenities this alternative can be designed to achieve the Landscape goals of maintaining the agricultural and land character of Laveen while preserving the views and vistas to the mountains.

Weaknesses

- This alternative has few weaknesses but some may be pointed out within the engineering considerations such as higher operations and maintenance requirements, and being very structurally intensive.

Alternative 2 – "Break the Grid":

Strengths:

- As with Alternative 1, this alternative includes many open channels that provide wildlife habitats and corridors, allows vegetation to grow at inverts, and provides for Multiple-use opportunities.
- This alternative also maximizes the use of the Laveen Area Conveyance Channel.

Weaknesses:

- With this concept of "Breaking the Grid", the alternative does not maximize the Loop 202 Transportation corridor corridor, consider shallow groundwater, or minimize operations and maintenance requirements.

Alternative 3 – Detention Basins:

Strengths:

- The detention basin concept in this alternative provides many Multiple-use opportunities and meets much the same Environmental goals as was observed for Alternatives 1 and 2. Additionally, the integration of detention basins with local parks and school sites makes for additional recreational opportunities.
- This alternative also provides the most direct flood control benefits for the GRIC.

Weaknesses:

- Within the Engineering considerations, this alternative is operations and maintenance requirement intensive and has not allowed for the possibility of shallow groundwater.

Alternative 4 – Storm Drain Concept:

Strengths:

- This alternative meets most of the Engineering goals by providing flood protection, minimizing operations and maintenance, incorporating the SRP canals and the 202 Transportation corridor, and maximizing the use of the Laveen Area Conveyance Channel. Operation and maintenance efforts are minimized.
- In addition, this alternative provides new trails and considers future trails along the Laveen commercial corridor.

Weaknesses:

- This alternative does not provide Multiple-use opportunities at the Laveen core.
- Some Environmental goals are met, but to a smaller degree than with Alternatives 1, 2 and 3.

Alternative 5 – "No Action":

Strengths:

- A "No Action" alternative is very low cost and does not require implementation of any new policies.

Weaknesses:

- The major weakness of this alternative is that it does not meet the key goal of the Laveen ADMP, which is to provide flood protection.
- No Multi-use opportunity goals are met with this alternative.

- While some Environmental and Landscaping goals are accomplished with this alternative, they involve protecting existing characteristics, such as avoiding historic and cultural sites, but the alternative does nothing to encourage new habitats or views and vistas.

Alternative 6 – Minimum Structural:

Strengths:

- This alternative meets most of the Engineering goals and objectives by providing flood protection, being implementable and cost-effective, maximizing the use of the Laveen Area Conveyance Channel, and minimizing operations and maintenance.
- Some Environmental, Multi-use, and Landscaping goals can be met with the alternative.

Weaknesses:

- This alternative does not provide significant wildlife corridors, connect with existing or planned trails, or integrate Multi-use opportunities at the Laveen core.

OPPORTUNITIES

The Gila River Indian Community lies downstream of the entire study area. Almost all the flows, which are not captured by the Laveen Area Conveyance Channel, will eventually outfall across the Gila River Indian Reservation boundary. Some of these flows currently cause flooding at the Vee Quiva Casino. Great opportunity exists to coordinate with the GRIC to assure that the flood control solutions provided in the ADMP will be of mutual benefit. Beyond flood control, the opportunity also exists to coordinate, multi-use and environmental goals related to the interface between GRIC and non-tribal lands. While not all of the six alternatives formulated include the GRIC, it is anticipated that the next phase of work, the Alternatives Analysis, will include the GRIC considerations.

Likewise, there is significant opportunity to develop regional flood control solutions that incorporate the off-site drainage system for the planned Loop 202 Transportation corridor. ADOT is beginning to prepare an Environmental Impact Statement and a Design Concept Report for the transportation corridor. The results of those studies will not be known until after the completion of this ADMP study effort. Therefore, the preferred alternative should be flexible enough to allow for any changes to the current proposed transportation corridor alignment may come about as a result of the EIS and DCR projects. Successful coordination of these combined efforts may result in significant taxpayer cost savings and additional recreational opportunities that may not be there if the studies were completed without regard for the planning efforts of the other party.

The Laveen Core planning area has the potential to bring to Laveen employment and business opportunities that are compatible with residential development, but otherwise do not currently exist. The incorporation of a multi-use channel or other flood control feature into the Laveen core area could serve as a catalyst to encourage development at the Laveen core in the manner envisioned by city planners.

Threats

Each of the Alternatives presented in this section of the ADMP, assume that the Laveen Area Conveyance Channel is an existing condition. While the Laveen Area Conveyance Channel has not yet been constructed, it will serve as the primary outfall for the major watershed in the study area. If for whatever reason the Laveen Area Conveyance Channel project is not constructed, the success of the Laveen ADMP could be threatened.

A significant measure in determining the success of this ADMP will be the willingness of the various funding partners to contribute to both the primary flood control and the secondary multi-purpose aspects of the project. While one of the responsibilities of the ADMP to identify an implementation strategy and prepare an implementation plan, there is no assurance that any major funding partner may choose not to participate in a timely manner, thus threatening the success of the plan.

Trends

Development is rapidly occurring in the study area. The need for regional flood control solutions for Laveen, while not currently at a critical level, will become more and more important as population increases over the planning horizon.

Development pressures will drastically alter existing demographics and land uses. The demand for parks, schools, recreation sites, and open space, consistent with residential development, is likely to build. The public demand for regional flood control facilities will however, lag behind the demand for multi-use facilities, as these quality of life issues confront people more often than their rather infrequent flood control needs. Continuing to focus on multi-use opportunities and environmental goals, as a way of achieving public acceptance of flood control projects, is a positive trend.